

REMARKS

STATUS OF THE CLAIMS

Claims 7, 9-19, and Claims 35-38 remain in the application. Claims 7 and 17 have been amended. Claims 8 and 20 have been canceled.

The Office rejected claims 7-15, 20, and 35-38 under 35 U.S.C. 103(a) as being unpatentable over *Behar* in view of *Manginell*.

The Office indicated that claims 16-19 would be allowable, but objected to these claims as being dependent upon a rejected base claim.

SUMMARY OF THE INVENTION

The present invention is directed a method for vaporizing a liquid or solid sample using a micropyrolyzer. The micropyrolyzer can perform heated chemistry by introduction of a reagent chemical to the sample prior to heating the sample. The micropyrolyzer comprises a substrate having a suspended membrane formed thereon and a resistive heating element disposed on the membrane for heating the sample. The micropyrolyzer can be constructed from semiconductor materials. The sample size can be less than 3 microliters and the heating rate can be 20 - 70°C per millisecond with very low power consumption.

SUMMARY OF THE ART

Behar, U.S. 4,710,354, discloses a method and device for heating of solid or liquid samples in small quantities comprising a sample holding rod that can be inserted into a tubular heated liner for pyrolysis of the sample.

Manginell et al., "Microfabrication of membrane-based devices by HARSE and combined HARSE/wet etching," describes high-aspect-ratio silicon etching that can be used to obtain thin supported membranes for use as microhotplates.

ARGUMENTS

AMENDED CLAIM 7, AND CLAIMS 9-15, 20, AND 35-38 ARE NOT UNPATENTABLE OVER Behar IN VIEW OF Manginell UNDER 35 U.S.C. § 103(a)

The Office rejected claims 7-15, 20, and 35-38, asserting that the Applicants' method for vaporizing a liquid or solid sample is unpatentable over *Behar* in view of *Manginell*. To establish a *prima facie* case of obviousness, *inter alia*, the prior art references must teach or suggest all of the claim limitations. *See* MPEP 2143. Applicants submit that amended Claim 7 is not obvious, because neither *Behar* nor *Manginell* teach or suggest a method for heated chemistry using a micropyrolyzer.

Heated chemistry involves the chemical reaction of a sample with a chemical reagent to form a new species that has enhanced properties for analysis. This heated chemistry requires a high temperature and fast heating rate to enable the reaction to occur in a pyrolyzer during the heating of the sample. Consequently, in conventional chemical analysis systems, this heated chemistry is performed in separate glassware prior to injection into the system for vaporization and analysis. *See* Application, page 3, lines 13-19.

The Office has asserted that "After pyrolysis, heating is stopped. A reagent, such as pentane or chloroform, is added. The vaporized products are removed from the trap and analyzed by a gas chromatography apparatus". *See* Office Action, page 4. *Behar* uses the solvents (pentane or chloroform) merely to dissolve the liquid or solid products from his pyrolysis that are collected in his cold trap. *See Behar*, col. 5, lines 22-43. Therefore, *Behar* introduces the solvents after the heating is complete and the pyrolysis products are cooled and collected in his cold trap. *Behar* does not use these solvents for heated chemistry (*i.e.*, his solvents do not chemically react with the sample during the heating of the sample).

Conversely, Applicants' reagent chemicals are introduced to the sample prior to heating to enable heated chemistry to occur. The high temperatures and rapid heating capability of the micropyrolyzer enables derivatization and vaporization of a small sample to be performed in the same device. *See* Application, page 4, lines 25-26. Applicants have

amended claim 7 to recite the introduction of the reagent chemical prior to heating of the sample. Support for this amendment is found at page 11, lines 13-14, and claim 8 in the original, as-filed patent application. Please note that the steps in claim 7 were inadvertently mislabeled in the RCE. Therefore, claim 7 in the RCE has two steps labeled “a)” so that claim 8 in the RCE mistakenly suggests that the reagent chemical introduction occurs after the heating step. This mistake has been corrected by the current amendment.

Amended claim 7 recites the introduction of a reagent chemical prior to heating of the sample. This limitation is not taught or suggested by *Behar* or *Manginell*. Accordingly, Applicants submit that claim 7 is now in condition for allowance. Applicants submit that claims 9-15, 20, and 35-38, that depend from and further define claim 7, are also in condition for allowance. *See* MPEP 2143.03.

ALLOWABLE SUBJECT MATTER

The Office objected to claims 16-19 as being dependent upon a rejected base claim, but indicated that these claims would be allowable, if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants have argued, *supra*, that amended claim 7 is now in condition for allowance. Accordingly, applicants submit that claims 16 and 18-19, and amended claim 17, that depend from and further define claim 7, are also in condition for allowance. *See* MPEP 2143.03.

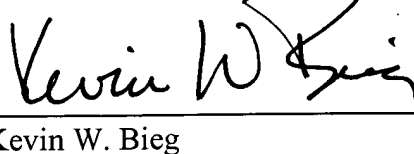
PETITION FOR EXTENSION OF TIME UNDER 37 C.F.R. §1.136

Applicants respectfully petition that the period for response to outstanding Office Action, mailed October 4, 2004 with a shortened statutory period for response of three months, be extended for an additional one month. This extension will not extend the time over the statutory period of six months from the date of the Office Action. Please charge \$120 for the one-month extension and any additional fees which may be required to Deposit Account No. 19-0131.

CONCLUSION

Applicants have amended the claims and urge that the application is now in condition for allowance.

Respectfully submitted,



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CERTIFICATION UNDER 37 CFR 1.8

I hereby certify that this correspondence and documents referred to herein were deposited with the United States Postal Service as first class mail addressed to: Commissioner for Patents, Alexandria, VA 22313-1450 on the date shown below.

Date: 2/3/05

By: Martha Injillo